DOCUMENT RESUME

ED 159 912 FL 009 761

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TITLE Intonation as an Early Marker of Meaning.
PUB DATE Aug 78
NOTE 26p.; Paper presented at the International Congress for the Study of Child Language (1st, Tokyo, Japan, August 10, 1978)

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS *Child Language; Infant Behavior; Infants; *Intonation; *Language Development; Language Patterns; Phonology; Preschool Children; Pronunciation; *Psycholinguistics; Semantics; *Speech; Stress (Phonology); Suprasegmentals; Verbal Ability; Verbal Communication; *Verbal Development; Vocabulary Development

ABSTRACT

One of the most remarkable aspects of the babbling of some babies is that it is produced with intonation contours that sound very much like adult sentence melodies. This study reviews the literature and examines longitudinal data collected from seven children. Some of the non-adult-like syntactic uses made of intonation by children for communicative functions include: (1) lowering pitch (in one case) or rising pitch (in another case) to express negation; (2) the use of pitch for "wh" questions in which the "wh" word is not produced; (3) the use of rising pitch in one-word utterances to indicate a request, while level tone indicates a wish-free interest; and (4) contrasting pitch in contiguous phrases to indicate contrasting meaning. Non-communicative uses of intonation include: (1) the use of melodic contours for "reading" during the babbling stage, (2) the use of sentence-melodies with babbling as language "practice," and (3) the use of sentence melodies as language play. The study indicates that the children develop their own rule-ordered intonation system that differs from the adult system, just as their morphological or syntactic system differs from that of the adult. (Author/NCR)

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Intonation as an Early Marker of Meaning

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As more and more researchers have been examining in detail the behavior of young infants, it has become increasingly evident that we have been underestimating their capabilities. Trevarthen (1974) found that by six weeks of age, infants approach persons and objects quite differently. By two months, they found activity that they maintained could best be called "prespeech" activities because both the context in which it occurred and its form indicated that it was a rudimentary form of speaking by movements of lips and tongue. Freedle and Lewis (1977) found that by three months, infants and their mothers were taking turns in interacting, much as in conversation, either with vocalizations or movement. Basing their teaching on what their child could comprehend rather than produce, Steinberg and Steinberg (1978) began teaching their son Kimio to read at 6 months of age. By 12 months he could identify 4 words on cards, none of which he could say, and by 24 months, he could identify 48 words, phrases and sentences, of which he was able to pronounce only

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15. These and many other research findings, offer new evidence that children develop a semantic system long before they are producing any "words" at all.

While we have been underestimating the capabilities of young children in some ways, we have been inclined to overestimate their ability in other ways. The speed with which children acquire the intonation system of language is a case in point. Bever, Fodor, and Weksel (1971), state "It is widely accepted in the literature that the child effectively masters the intonation pattern of his language before he has learned any words at all." While it is well known that children produce a wide range of intonation patterns in their babbling, it is not the case that children have mastered the intonation system. What they apparently do is to note that speakers of the language do not speak in a monotone, but use variations in pitch, duration, stress, rhythm, etc., and they have imitated these patterns for use with their speech sounds. As early as five months, some children babble with sentence-like intonation contours. Of the seven children whose language development I study longitudinally and on which this study is based, Fred produced such babbling at the earliest age while Jennie did not produce them at all. Leopold mentioned (1949, II:256) that Hildegard did not babble with intonation patterns. This is not unusual, and it should be stressed here that some children do, and some do not, use sentence-like intonation contours for babbling.

Weir (1962) pointed out that from the end of Anthony's first year on, when she asked him to repeat a sentence with a rising intonation, his repetition of the sentence included a rising contour, and if the sentence she gave him had a falling intonation, Anthony repeated it with a falling contour. This was using language, not babbling. Chao (1951:32) observed that his grandaughter Canta "acquired tones very early, as most Chinese children do."

Leopold (1949, II:254-5) reported that at 1:1, Hildegard tried to imitate bimmel bammel beier, something she had heard repeated as an object was swinging on a string, and although she could only pronounce the first two sounds, her pitch and intonation were correct. Karla said the same word at 0:11, but did not reproduce the intonation until 1:1.

Before children are producing any words at all, they can often imitate intonation patterns that are more complex than they will be producing during their early language period. In pretending to read, for example, all of the children I study except Jennie used intonation patterns that far exceeded any sentence they could produce using words.

Jakobson (1968:43) found that in aphasic patients, sentence intonation is preserved after other aspects of language are lost. He suggests that the reason is that, in contrast to the phoneme, intonation patterns possess a constant meaning, e.g., a falling contour marks the end of a meaningful unit, etc. This "constant meaning" is universal. Greenberg (1977) has noted that all

languages use intonation to mark sentence boundaries. Statements usually have a fall in pitch, which is greatest toward the end of the sentence, and questions are generally marked either by a rise in pitch, a specific question word, or a combination of the two. Bolinger (1968:32) suggests that "probably all languages use the direction of intonation to show where major divisions of utterances start and stop. One effect that is found everywhere is a running down, a tendency to drift toward a low pitch when the speaker nears the point where he intends to stop. He starts full of energy, but deflates at the end like a bagpipe running out of wind. But, if he is unsatisfied--as he normally would be in asking a question--his pitch goes up. As with excitement and depression these tensions and relaxations may be instinctive, but we seem to have learned to use them intentionally." We see, then, that the sentence, like the word, is a universal unit, is classified into basic types such as 'statement' and question,' and is marked as such in most languages of the world by intonation.

To say that children perceive and produce intonation patterns at very early ages is not to say that they have "mastered" intonation. What children have acquired is the comprehension and use of broad, largely universal patterns, not the fine nuances developed by the speakers of each language. For example, I recently called to see if some printing I had ordered was ready. The man answered, "Oh, yes, the

work has been done for weeks." What made this a pun (referring to a period of time instead of my name, Weeks) was the extra rise and lowering of intonation, plus lengthening, on the word weeks. This, and many other ways that adults use intonation are beyond young children's comprehension or production. While a child's language is patterned after the adult language, no aspect of the child's language at age 1, 2, or even 3, matches that of the adult. What is surprising is that there are as many similarities as there are, for we know that children create as they borrow. Children develop their own rule-ordered system of intonation, just as they develop their own systems of phonology, morphology, and syntax, none of which match the adult system at this early ages.

Meaning in Intonation

Children learn in early infancy that intonation carries meaning and emotion. Key (1975) contends that emotions and attitudes are always projected by nonverbal means, part of which is intonation. Bolinger (1964) compares intonation to the ocean--the ripples, waves, swells, and tides. Or more accurately, he says, "ripples on waves on swells on tides, because each larger movement carries the smaller ones on its back." He compares the ripples to the accidental changes in pitch, the irrelevant quavers. The waves are the peaks, and valleys that are called accent; the swells are the separations of discourse into larger segments; and the tides are the tides

of emotion. Bolinger suggests that the emotion that we either deliberately or involuntarily put into our message and that is respected as a genuine part of it, is an expansion and contraction of the total range of pitch. If the speaker is bored, indifferent or depressed, his pitch range will be shallow, while enthusiasm, anger, surprise, or other emotions tend to prompt pitches well above and below the average pitch. He believes these tides are much the same in all languages. The reason for this is that these variations are physiologically determined, just as nasality in whining and complaining is. We can see an explanation, then, for the fact that language directed to babies usually contains more variation in pitch (is more melodic) than language directed to adults. Babytalk is used to express emotion. Babytalk in American English is also marked with more rising intonations than unmarked speech, because adults ask questions of babies, even though they know the questions will not be answered. Children learn rather young to use this exaggerated intonation. For example, Fred was 3:10 when he said to Leslie (0:6), "Hi Lesh. How are you? Oh, you're laugh--playing laughing all the time! Why? Why? Why? Can you shake hands? How come you laugh all the time? How come?" This was all said with a generally high pitch and exaggerated intonation. It was an expression of affection on his part, and she responded by smiling and kicking her feet.

It is apparent that children learn very early that intonation has the capability of expressing meaning, and they use it

in this way, though not necessarily in adult-like ways. Often their use of intonation seems quite idiosyncratic. Some of the ways in which children do use intonation are discussed here.

Intonation Patterns Used by Children

The particular ways in which children use intonation patterns will be divided into communicative, or socialized, functions, and noncommunicative, or egocentric functions.

Communicative Functions

1. Lowering Pitch

I have already mentioned that a fall in pitch generally marks the end of a sentence. The basic contour in American English is three level, 2-3-1: I know that.[1] Children begin to use a 2-level falling pitch with one-word utterances. There is naturally no confusion in children's use of such a fall in pitch to indicate the end of a sentence. However, a falling pitch is sometimes used for other meanings. For example, Leslie used a falling intonation pattern to indicate negation before she was able to include a negative morpheme. While no was one of Leslie's first words, she did not include it in sentences, even as a first morpheme to negate a sentence as many children do. For example, it is common for children to produce such sentences as "No mommy read," to mean "Don't read," "No sit there," to mean "Don't sit there," etc. From about 2:4 to 3:2, Leslie used anaphoric negation (i.e., I asked her (2:6) "Can we take turns?" and she answered, "No. My turn."), but

she did not use sentence negation. Her usual marker of negation was a lowering of pitch. She regularly said "I know," with the know slightly lengthened and lowered more than simply for marking the end of a sentence, and it meant, "I don't know." I questioned her about it a number of times to be sure. She also used a steadily falling intonation to negate longer sentences. For example, Leslie's mother had told me she could sing "Twinkle, Twinkle Little Star," and I asked her if she would sing it. She answered:

Leslie: (2:10) /i gi ki gai dor nau/ 'I'm not going to sing 'Twinkle Twinkle Little Star' now.' However, I didn't understand her correctly.

Weeks: Are you going to sing it now?

Leslie: No! /ai van gi ki kai gor a mi hom/ 'No! I want to sing 'Twinkle Twinkle Little Star' at me (my) home.'

A couple of months later Leslie was looking through two books with pictures of animals in them. She discussed the animals on each page in a similar way:

Leslie: (3:0) /e be...i beg hurt me...e o mi/ 'Ladybugs won't hurt me. They love me.' (i beg was her usual way of saying ladybug.)

/e wrn...e wrn kɛr mi/ 'The worm doesn't scare me.'

Weeks: Don't worms scare you?

Leslie: /no e o mi/ 'No, they love me.'

/i yiən i gɛr mi/ 'The lion doesn't scare me.'

She continued with other animals, assuring me (or herself) that they were not frightening. The falling intonation in these sentences is different than that used for affirmative statements. In Leslie's negated sentences, the intonation falls steadily, following the subject, if there is one. Whereas for affirmative sentences, the drop in pitch is on the final syllable or final word of the sentence.

Many examples could be given of her use of lowering intonation for negation, and I am sure that many other instances went unnoticed, for the pattern is not sufficiently distinctive to always be unmistakable.

It should be mentioned here that in adult English a negative statement often has a different intonation pattern than a similar positive statement, and it is possible that Leslie had noted this.

One example of such a deviant intonation pattern for negative statements is offered by Iannucci (1978). In discussing the acquisition of "quantifier dialects" by children he offers examples such as:

All the kids aren't asleep.

Characteristically in such a sentence, the stress and high pitch is on all, while the intonation is fairly level for the rest of the sentence, except for a slight rise on the final syllable. With this intonation pattern Iannucci has found that adults and children of about age six and older interpret this sentence to mean "Some of the kids are asleep and some

are not," that is, they interpret the sentence as though the quantifier all had been negated rather than the verb. Regardless of the intonation pattern used in presenting such sentences to younger children, they interpret it to mean that none of the kids are asleep.

His paper represents another example of a researcher assuming that young children have rather sophisticated capabilities regarding the comprehension, if not production, of intonation. He notes, "The clear marking of the Neg-Q interpretation by intonation, further, is no trivial matter with regard to consideration of child language acquisition, since we know that children normally latch onto intonation at the very earliest stages of grammatical development. The question now is: how do children handle these quantifier sentences?" Again we see that while children have learned that intonation is meaningful, and they have learned to imitate many patterns and make use of some, they have not at all "mastered" intonation. As for how children handle these quantifier sentences, they are interpreting them correctly according to the grammatical structure of the sentence, whereas the adults are interpreting the sentences in a nonstandard way. In English it is normal to negate the quantifier, if that is what is meant. It is also usual to move the negative morpheme as far front in the sentence as is possible. Iannucci maintains that the intonation pattern indicated above marks the sentence as meaning that the quantifier is negated, and that adults almost

invariably interpret it this way. In an informal survey of my own, I wrote this sentence on the board for my child language acquisition class along with the two possible interpretations: "None of the kids are asleep," or "Some of the kids are asleep and some are not." In spite of the fact that I did not say the sentence aloud at all, my entire class including an 11-year-old girl who was visiting that day, voted for the second interpretation, "Some are asleep and some are not." Since being alerted to this structure by David Iannucci, I have noticed similar sentences, obviously with the negated-quantifier meaning, in the newspapers and popular magazines. While it has become common, and is interpreted in a way that is deviant from the grammatical structure of the sentence, the sentence itself is somewhat deviant--it does not follow the usual rules for negation. As such, it may be expected to be acquired late by children.

2. Rising Pitch

As was mentioned earlier, languages of the world universally use rising pitch or question-words or a combination of the two for questions. Knowing just a little about children, and knowing the English language system for questions, one could easily predict that children would find it easier to learn to use rising intonation than to learn the series of English question-words plus the sentence tranformations required for standard adult questions. Add to this natural

simplicity the fact that more rising intonations are directed to young children than to adults, and you add to the probability that children will acquire this early on and use it freely.

With English-speaking children, the use of rising intonation to ask questions or express uncertainty begins as soon as they have one-word utterances to which they can attach the intonation. For example, before she was one year old, Leslie would ask "Dada?" when she heard a car in the driveway. She continued to look questioningly at me until I told her it either was or was not Daddy. Or if her mother was not in sight, she would look at me and ask "Mama?" and wait until I explained where her mother was or when she would be back. Such questions are usually interpretable by the context, but not always, and a great deal of frustration often results from adults' inability to correctly interpret questions.

Leopold (1949, II:355) reported that at 1:3, Hildegard used the "word" /ʔə/ and <u>da</u> with a rising intonation to mean that she was requesting something. However, a high level tone was an emotionally charged indication of interest, but not a request.

With Leslie, even questions that were clearly of a wh-question nature, such as "i mommy bear?" (3:0) where she clearly wanted to know <u>where</u> the mommy bear was, were asked with rising intonation even though adults would not use it because they would be using the question-word <u>where</u> instead of intonation. Children use what is at their disposal, and at this stage of

development, Leslie was not yet producing question-words, (although she appeared to be producing a substitute for them), so she continued to use rising intonation. It is a common, well documented pattern. Furthermore, such questions are seldom misunderstood.

Just as in the adult system, children use rising intonation to see if the listener understands them. For example, one of the Yakima Indian Children with whom I work was telling me about a person I didn't know, and he was trying to explain who he was. He said, "He's one of our brother longs." It was a statement, but he said it with a rising intonation, to see if I knew what he meant. I didn't, and asked, "He's what?" He repeated, again with rising intonation, "He's one of our brother longs." I still didn't understand and he became embarrassed.

Rising intonation is also used for attention-getting. At 2:5 Greg said, "Look! Round round?" He was playing with some clay, and trying to get my attention, not asking a question. However, this may be thought of as a request in that the child is asking, "Will you notice me?" Jennie, Leslie and Hildegard all used /ʔə/ with a rising intonation during their earliest language period to make requests of various kinds.

Greg also used a rising intonation with "Fine," in response to "How are you?" at age 2:5. This seems to me to be an acceptable intonation contour even for an adult, even though it maybe assumed to be a statement, not a question.

In my own material and that which I have reviewed, I have found one particular exception to the rule of children following general adult patterns with rising intonations. This exception is reported by Lord (1974), who noted that at 2:0, her daughter Jennifer used a rising intonation to indicate negation. For example, "I wan' put it on!" starts out at a normal pitch and the remainder of the sentence climbes to a higher level, except for a final brief fall at the end. It meant, "I don't want it on!" "I want need help!" meant "I don't want any help!" This may be an idiosyncratic use of this pattern on Jennifer's part, or she may have heard the pattern used by an older person in conjuction with a negative element. It doesn't seem to me to be an unacceptable pattern for negation even for adults, particularly when the statement is directed to children.

While there is no one intonation contour that is associated with negation in adult English, it does appear that a negative statement often carries a different contour than a positive one, due in part to the different stress usually found in a negative statement.

3. Contrasting pitch

I have noted a number of examples of children using contrasting pitch in contiguous phrases to indicate contrasting meaning in non-adult ways. This was another one of Leslie's ways of expressing negation before she was able to include a negative morpheme in a sentence. For example, she was looking

at a book that pictured a boy and a dog in bed together:

Leslie: (3:1) Oh oh! Gog feet sticking out! Boy feet sticking out! (The dog's feet are sticking out. The boy's feet are not.)

The fact that the two similar sentences had different intonation patterns would lead one to think that the meaning was also different, but without the pictures it would not have been clear just what she meant.

In the following example, I had asked Leslie if she needed to blow her nose, and she replied:

Leslie: (2:11) I a ikky nothe. Fwe a ikky nothe.

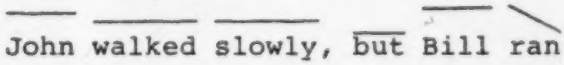
(I don't have an ikky nose. Fred has an ikky nose.)

By this, of course, she meant that she did not need to blow her nose, but I should look into the matter of Fred's nose. In this case, the first word of each sentence had stress and high pitch, but the first sentence remained level after that, while the second sentence ended with a rise. In a similar situation, an adult relies on the negative morpheme, so this is a child-like strategy, and I might not have deduced the meaning if the context had not made it clear.

The point I want to make is that Leslie was using a contrasting intonation pattern to express a contrast in meaning, and even though adults do use intonation to express contrasts, her system was her own, not the adult system.

One contrastive adult system which has been examined by Cruttenden (1974) is the contrasting intonation patterns used

in reporting football scores in British English, in which the intonation used in announcing the first team and its score anticipates the second score. There is a complex pattern of differences depending on whether the home team or away team wins or loses, or whether it is a draw. He found that 15 adults, chosen for their non-interest in football, were all able to predict the second score correctly, but that 28 boys, aged 7-10 were just beginning to acquire the ability to do this. The first pattern to be learned by children, at about age 9, was that of the draw score. Cruttenden says there is a strong relationship between age and the score on this test, and a lesser relationship between football interest and the score. As he points out, children had heard such contrastive patterns as:



A falling-rising pattern (as in but Bill) regularly indicates "new" information. Children have been found to use intonation productively for this purpose during the two-word utterances stage.

Chafe (1970) has brought to our attention the fundamental semantic distinction between the elements in a sentence which convey new information and those which convey old information, and suggested it as a promising area for further study. Wieman (1975) is one who looked at this in a study of the two-word utterances of five children aged 1:9 to 2:5. The tape-recording was done during play sessions. She found, as most child language

researchers have, that children have very strong patterns of stress in their speech. In two-word utterances, the stressed word carries the high pitch. She found that out of 28 possessive phrases, the locative element was stressed in every instance; in attributive phrases, stress was usually on the head noun; in verb plus object phrases, it was the object that was stressed. In examining the exceptions to the patterns, the determining factor seemed to be whether or not there was "new" information included in the phrase. If so, the new information received stress. For example, whereas in a noun-locative phrase, the locative was usually stressed, in the case where the mother asked "What is in the street?" the child answered, "Firetruck street." In another instance the same child's mother asked "What is on the side of the milk truck?" as she pointed to a letter A on the side of a truck in a book. He answered "Milk-truck B," again stressing the noun object, which was new information, rather than stressing the location, which was the rule with old information. Sentence position was not the determining factor, as the children produced pairs such as here goes and goes here, both of which meant, "it goes here."

Even the youngest subject, who was 1:9, showed this correspondence between stress and new information. The capability of using this pattern of intonation and stress to express meaning develops during the early language production period. It seems that even in two-word utterances, the child is functioning with some rule that specifies that the more im-

portant of the two words should be produced more prominently by means of pitch, volume, duration, etc. The determination as to which word is more important is made on the basis of several factors: new vs. old, location vs. action, possession vs. object possessed, etc. The decision is based on semantics, not on position in the utterance nor on part of speech.

In stages beyond the two-word utterance stage, children are able to suggest more complex contrasts in meaning by means of intonation. Their contrasts do not always fit adult patterns of contrast, but they are meaningful to the child, and this meaning is usually communicated successfully.

Noncommunicative Functions of Intonation

1. Melodic Contours for "Reading"

A very commonly reported activity for children who have been read to is for the child to look at a book and pretend to be reading. At early ages, this reading usually involves sentence-like melodies and babbling. Even though children are using some one- or two-word utterances at this time, the intonation contours they use with babbling are too advanced for any meaningful utterances they could possibly produce.

Because the seven children whose language development I study have all been read to a great deal and are very familiar with books, they have all begun to pretend to read at early ages. Jennie, the Korean child who was adopted at age 0:5, was the latest to babble while she looked at books, and was the only one who did not babble with sentence-like melodies. From 1:3 to

1:9 she used a steady repetition of "dubba dubba dubba dubba dubba dubba" as she turned the pages of the book. At 1:9 she changed to a mid vowel (a), but her reading still sounded more like singing than like English sentences. It should be noted that even though Jennie's reading intonation did not follow anything similar to English intonation patterns, it was different than her usual meaningful speech--she did not use this singsong pattern any time except for reading.

2. Imitative/Expressive

It is quite a usual occurrence for children to imitate intonation patterns. I have discussed it throughout this paper. However, the kind of imitation I want to mention here is not babbling--it uses real speech and an imitated intonation pattern that does not appear to be productively meaningful to the child. For example, at 2:5, Greg was making cookies out of clay--he told me they were cookies--and I said "It looks yummy!" and he replied "Dat good!" Even though he changed the words, the intonation was almost an exact replica of mine even as to length. And Leslie always said San Diego with the same intonation pattern she heard, even though she didn't pronounce it quite right. She also used an imitated pattern for hello when she answered her toy telephone. She said "ɛo o." These and many more were cases of using meaningful language with an imitation of the adult intonation system rather then an evolvement of their own system, such as the use of lowering intonation to express negation, such as Leslie did.

3. Melodic Contours for Language Practice

It is not my intention here to suggest that practice is necessary in the acquisition of language, but it is nevertheless the case that many children do engage in activity that sounds like practice. This is as true of intonation as it is of lexicon, morphology, or syntax. Jennie was a particularly good example. She had done virtually no babbling during her prespeech period, and as mentioned earlier, even her "pretend reading" used a singsong rather than sentence-like intonation pattern. But at 2:3, when Jennie was producing mostly one-word utterances in real speech, she began her first practice with sentence intonation patterns. She seemed to be using Greg as a model; she stood beside him as he talked to their mother. Jennie gave the impression she was trying to say what he was saying, repeating it about a syllable behind him. When Greg paused, she paused. When he laughed, she laughed, and when he resumed talking, she resumed her babbling. She did this repeatedly until her mother asked her to stop because it made it impossible to understand what Greg was saying. Jennie's meaningful speech was somewhat less fluent than that of the other children. There was a pause between every word, as though she were considering what to say next. Her imitation of Greg, who was 4:7, was her first attempt at a normal speech sound. Many times after this, for a period of several months, as I walked down the hall past her room, I could hear her practicing.

Jennie was a somewhat unusual case in that she spent the first five months of her life in Korea, but many other children are reported practicing intonation patterns in much the same way even after they are producing some meaningful language.

4. Level Intonation

I have many examples of utterances that exhibit a virtually level intonation pattern. For example, at 2:5 Greg said "apple juice," and "Talk mike phone," with no discernible stress or change in pitch. I have the impression in most of these cases that the child is concentrating on pronouncing the words--he is reaching the limit of his production capability--and the result is a non-fluent utterance. A flat intonation pattern in an adult might indicate boredom or some similar emotion, or lack of emotion, but in a child who is not yet an accomplished speaker, it may simply indicate that he cannot concentrate on everything at once. While he can produce many sentence melodies easily with babbling, they disappear when he is concentrating on lexicon and syntax.

Summary

One of the most remarkable aspects of the babbling of some (not all) babies is that it is produced with intonation contours that sound very much like adult sentence melodies. The fact that babies are able to imitate intonation so well has led some observers to conclude that children have acquired the adult system at a very early age. Such is not the case. Children do, however, appear to note that adult speech makes use of variation in pitch, duration, stress and pauses, and they learn to do the same with their babbling. Children also learn that intonation carries meaning, and they use intonation to express meaning from the earliest language period on. They use rising pitch, lowering pitch, and contrasting patterns to express particular meanings in communication with others. Children also use intonation in noncommunicative, but meaningful, ways, such as for language practice or for their own entertainment. However, the ways they use intonation do not necessarily coincide with the adult system; children develop their own rule-ordered intonation system that differs from the adult system, just as their morphological or syntactic systems differ from the adult language.

Footnotes

[1]British and American English intonation patterns are not the same.

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